

EFFECTIVE DATE

December 10, 1996

LANL-CST-DP-101, R1

Page 1 of 8

## COLLOID SAMPLING FOR YMP STUDIES

### ***LOS ALAMOS QUALITY PROGRAM***



#### APPROVAL FOR RELEASE

C. R. COTTER - PREPARER

Signature on file

DATE

I. R. TRIAY - PRINCIPAL INVESTIGATOR

Signature on file

DATE

M. J. CLEVINGER - QUALITY ASSURANCE PROJECT LEADER

Signature on file

DATE

**Los Alamos**  
Yucca Mountain Site  
Characterization Project

## HISTORY OF REVISION

REVISION NO.	EFFECTIVE DATE	PAGES REVISED	REASON FOR CHANGE
R0	08/17/95	N/A	Initial procedure
R1	12/10/96	1, 2, 3, & 8	Minor non-substantive editorial changes

**Los Alamos**

Yucca Mountain Site  
Characterization Project

# COLLOID SAMPLING FOR YMP STUDIES

## 1.0 PURPOSE

To outline the procedure for the collecting and shipping of colloid samples from sample wells.

## 2.0 SCOPE

This procedure is applicable to colloid samples collected for Los Alamos National Laboratory (Los Alamos) Yucca Mountain Site Characterization Project (YMP) experiments.

## 3.0 REFERENCES

LANL-YMP-QP-02.7, Personnel Training  
LANL-YMP-QP-03.5, Documenting Scientific Investigations  
LANL-YMP-QP-08.1, Identification and Control of Samples  
YAP-SII.4Q, The Collection, Submission, and Documentation of Non-Core and Non-Cutting Samples to the Sample Management Facility for Site Characterization

## 4.0 DEFINITIONS

Colloid: A substance that is in a state of division preventing passage through a semipermeable membrane, consists of particles too small for resolution with an ordinary light microscope, and in suspension or solution fails to settle out and diffracts a beam of light.

## 5.0 RESPONSIBILITIES

The following personnel are responsible for the activities identified in Section 6.0 of this procedure:

- Principle Investigator (PI)
- Users of this Detailed Procedure (DP)

## 6.0 PROCEDURE

The use of this procedure must be controlled as follows:

- If this procedure cannot be implemented as written, YMP personnel should notify appropriate supervision. If it is determined that a portion of the work cannot be

accomplished as described in this QP, or would result in an undesirable situation, that portion of the work will be stopped and not resumed until this procedure is modified, replaced by a new document, or the current work practice is documented in accordance with QP-03.5, Section 6.1.6.

- Employees may use copies of this procedure printed from the controlled document electronic file; however, employees are responsible for assuring that the correct revision of this procedure is used.
- When this procedure becomes obsolete or superseded, it must be destroyed or marked “superseded” to ensure that this document is not used to perform work.

## 6.1 Principle

This procedure describes the collection and shipping of colloid samples from sample wells for the study of colloid-facilitated transport at Yucca Mountain.

## 6.2 Equipment and Hardware/Software

- a) 0.5 or 1.0 liter borosilicate glass containers are used to ship and store colloid samples.
- b) tygon tubing transfer hose
- c) collection apparatus (Attachment 1):
  - Nuclepore Polycarbonate Pleated Cartridge 0.4  $\mu$  m Filter.
  - Nuclepore Polycarbonate Pleated Cartridge 0.5  $\mu$  m Filter.
  - 2.5 Gallon Reservoir.
  - Two peristaltic pumps to push 0.0-1.5 liters/minute.
  - Amicon Hollow Fiber Membrane Cartridge (H1P10-20).
  - Two Flow Meters.
  - Sample collection valves.

### 6.2.1 Equipment Malfunctions

Equipment failures are readily detected and repaired. If a problem occurs with the equipment which may be considered a potential source of error, it is documented per Section 6.7.

### 6.2.2 Safety Considerations

Ensure that a member of the collection team has received Nevada Test Site General Employee Training (GET) and follows other site specific safety rules as directed.

### 6.2.3 Special Handling

The collected samples will be handled, shipped, and stored according to QP-08.1. The collected sample should never be contacted with any unclean surfaces. The collector must ensure that the containers to be shipped are properly sealed to prevent contamination. Commercial and/or federal carriers can be used for shipping samples collected using this DP.

## 6.3 Preparatory Verification

Coordinate the collection date with the responsible organization (e.g., USGS). For well access, call Plant Maintenance at N.T.S. (702) 295-6463. The Sample Management Facility must be notified at (702) 295-6109 that samples are going to be collected and the appropriate number of sample request forms and SMF barcodes with unique identifier must be requested (YAP-SII.4Q).

Borosilicate glass containers are available at the NTS warehouse prior to sample collection or are shipped from Los Alamos.

Transfer hose is shipped to NTS prior to sample collection. The hose may be stored and used again for only the same well. When in storage, the hose is placed in a plastic bag, labeled with the well name and previous user's name.

Before sample collection, purge the collection system for a minimum of one hour using water from the source being sampled. While the collection system is being purged, flush the borosilicate containers five times with nanopure deionized (DI) water.

Verify that the sample collection forms have been completed.

### 6.3.1 Hold Points

No hold points are included in this procedure.

### 6.3.2 Calibration

No equipment is required to be calibrated.

### 6.3.3 Environmental Conditions

The collector must ensure that the collected sample is not exposed to extreme temperatures ( $<0^{\circ}\text{C}$  or  $>99^{\circ}\text{C}$ ) during handling, shipping or storage.

## 6.4 Control of Samples

A unique identifier will be assigned to the colloid sample collected. The identifier consists of the container type, filter size, amount of well water, the Julian date collected, and the collector's initials. All samples will be controlled according to QP-08.1 and YAP-SII.4Q.

The collected water must be stored in closed containers in a controlled access area.

## 6.5 Implementing Procedure

6.5.1 Ensure that preparatory verification has been accomplished as per Section 6.3.

### 6.5.2.1 Sample Point "A"

- a) Collect the desired number of samples using Borosilicate Glass vessels. Allow borosilicate containers to overflow for one minute before sealing.
- b) Mark the vessels unfiltered, seal and apply barcode labels.

### 6.5.2.2 Sample Point "B"

- a) Collect the desired number of samples using Borosilicate Glass vessels. Allow borosilicate containers to overflow for one minute before sealing.
- b) Mark the vessels 0.4  $\mu\text{m}$  filtered, seal, and apply barcode labels.

### 6.5.2.3 Sample Point "C"

- a) Collect the desired number of samples using Borosilicate Glass vessels. Allow borosilicate containers to overflow for one minute before sealing.
- b) Mark the vessels 0.05  $\mu\text{m}$  filtered, seal, and apply barcode labels.

### 6.5.2.4 Sample Point "D"

- a) Collect the desired number of samples using Borosilicate Glass vessels. Allow borosilicate containers to overflow for one minute before sealing.

- b) Mark the vessels Amicon Filter Cartridge (H1P10-20) filtered, seal, and apply barcode labels.

- 6.5.3 Ensure that sample collection forms and notebook entries have been completed according to LANL-YMP-QP-08.1 and YAP-SII.4Q.
- 6.5.4 After the containers are filled and shipped to their final destination, cation and anion chemical analysis should be performed on a sample of water collected.
- 6.5.5. Logbook/Binder Entries
  - a) Unique identifier of sample(s) collected.
  - b) Container Barcode Number
  - c) Type of container used for collection.
  - d) Filter size
  - e) Volume of nanopure water
  - f) Volume of well water
  - g) Cleaning agent used (if any)
  - h) Chemical analysis of collected sample(s).
  - i) Time collected
  - j) Date collected
  - k) Collector Signature
  - l) Detailed procedure used
  - m) Special conditions (if any)
  - n) If the colloid sample collected is discarded on the basis of contamination as determined by the chemical analysis, record this action in the logbook or binder.

## 6.6 Data Acquisition and Reduction

No methods of data reduction are employed in this DP. Each organization using this DP should maintain a colloid sample collection logbook or binder. The active recording of data as specified in section 6.5.5 will constitute the data acquisition.

## 6.7 Potential Sources of Error and Uncertainty

Sources of error or uncertainty for the collection of colloids are contaminated collection vessels or transfer hoses. Sample contamination can be detected by inspection of the water sample analysis, e.g., fiber particles.

## 7.0 RECORDS

Records resulting from the proper execution of this DP are entries in the laboratory notebooks and electronic media on which data is stored. Generation of these records will follow QP-03.5 and YAP-SII.4Q.

## 8.0 ACCEPTANCE CRITERIA

Proper recording of the data specified in Section 6.5.5 and submittal of SMF sample forms as per QP-03.5 and YAP SII.4Q constitute the acceptance criteria for this DP.

## 9.0 TRAINING REQUIREMENTS

9.1 Personnel assigned to this work will be qualified by formal “hands-on” training under the supervision of an already qualified collector.

9.2 Prior to conducting work described in Section 6.0, users of this procedure require training to this procedure. Training to this procedure is accomplished by “read only”. Training will be documented per LANL-YMP-QP-02.7.

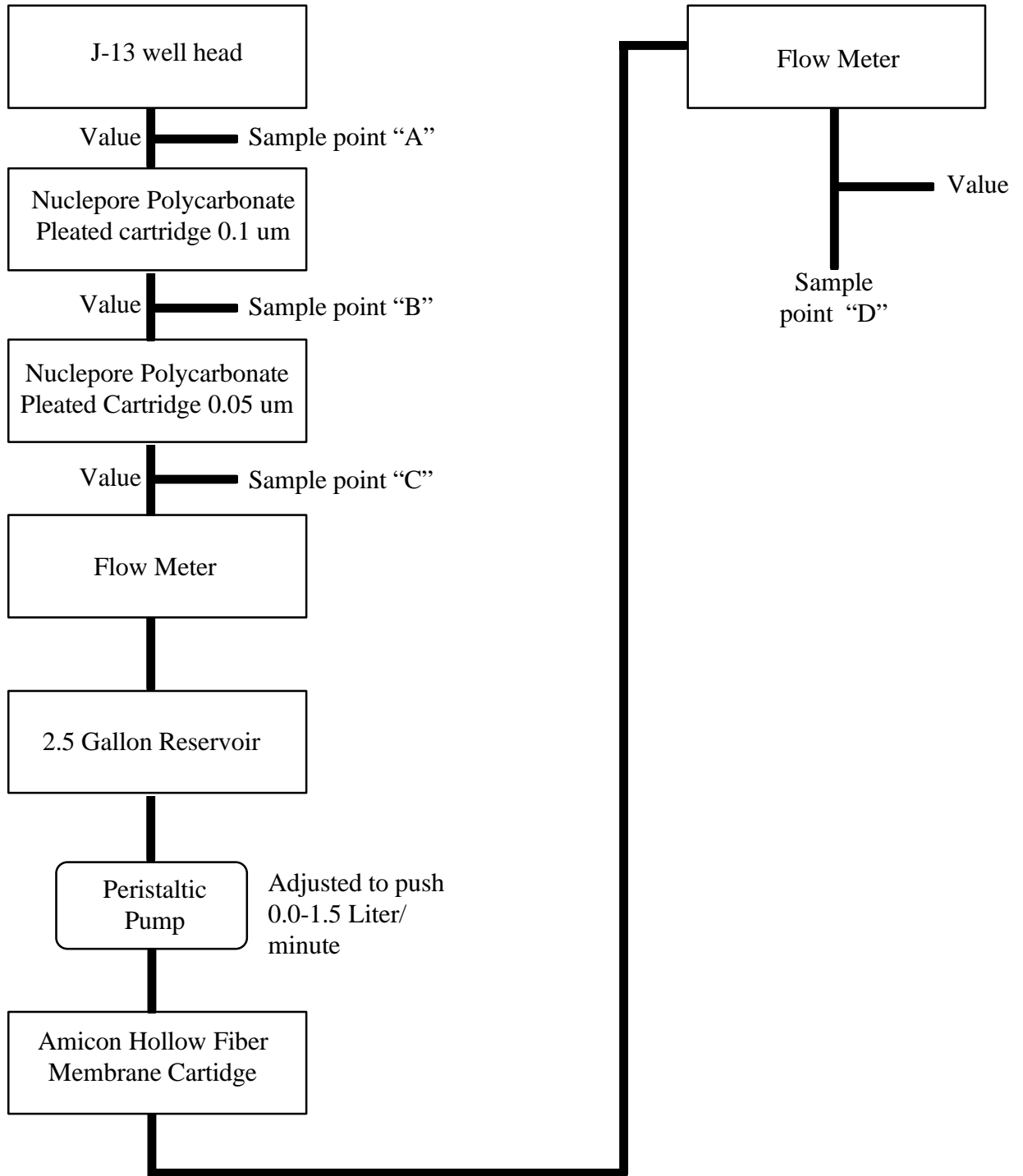
## 10. ATTACHMENTS

Attachment 1: J-13 Colloid Experiment, Flow Diagram of Water Collection Apparatus  
(1 page)

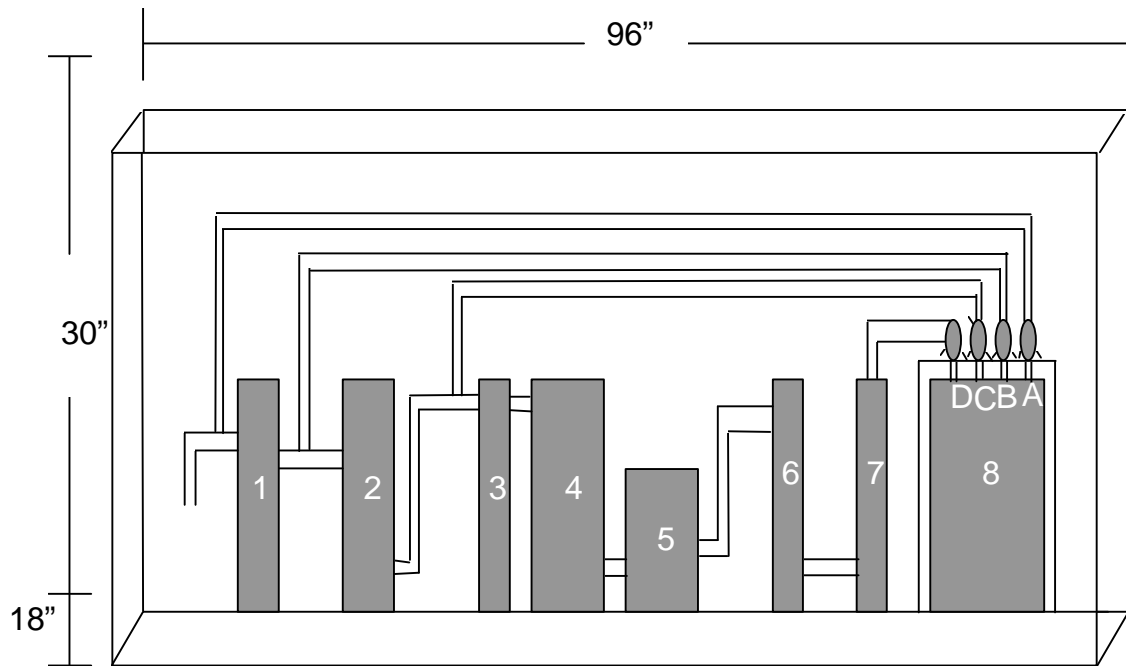
Attachment 2: Water Collection Apparatus (1 page)



## J-13 Colloid Experiment, Flow Diagram of Water Collection Apparatus



## Water Collection Apparatus



1. Nucleport Quick Rinse 0.4 um Filter.
2. Nuclepore Quick Rinse 0.05 um Filter
3. Flow meter
4. 2.5 Gallon Reservoir
5. Peristaltic pump to push 1.0-1.5 Liters/minute
6. 2 Amicon Hollow Fiber Membrane Cartridge
7. Flow meter
8. Sample collection point for A. B. C. D. VALVES